

THE OCCURRENCE OF *CHAETOSTRICHA* IN NORTH AMERICA,
WITH THE DESCRIPTION OF A NEW SPECIES
(HYMENOPTERA: TRICHOGRAMMATIDAE)

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Abstract.—The genus *Chaetostricha* is herein reported from North America for the first time. A new species, *C. thanatophora*, a parasite of eggs of the mirid *Neurocolpus longirostris* Knight, is described. This species is most similar to two African species, *C. mahensis* (Kieffer) and *C. miridiphaga* Viggiani.

Key Words: Hymenoptera, Trichogrammatidae, *Chaetostricha* taxonomy

Chaetostricha, as currently defined by Doutt and Viggiani (1968), is a moderate-sized genus of 19 species. It has been recorded from all continents except North and South America. *Chaetostricha thanatophora*, a new species described here, is a common parasite of the eggs of *Neurocolpus longirostris* Knight (Miridae) in California. This mirid is a pest of pistachios in the foothill regions of northern and central California wherever orchards are situated adjacent to its primary host plant, California buckeye [*Aesculus californica* (Spach) Nutt.] (Rice et al. 1988). Most of the material of *Chaetostricha thanatophora* was collected by Dr. Richard E. Rice, University of California, during his studies of the biology of *N. longirostris*.

***Chaetostricha thanatophora*, NEW SPECIES**

The following description is primarily based on slide-mounted material. Color pattern and body length were taken from critical point dried specimens killed and preserved in ethanol.

Color: Dark brown with following structures yellow: dorsum and front of head (vertex, frons, lower face), flagellar segments of antenna, midline of pronotum, metanotum,

propodeum, base of first segment and apex of last segment of gaster, apex of femora, base and apex of tibiae, tarsi. Color-variable structures as follows: scape, pedicel of antenna entirely brown to almost entirely yellow; scutellum brown or yellow; mesoscutum entirely brown or yellow with two elongate subparallel light to dark brown maculae on anterior $\frac{2}{3}$; pronotum with lateral areas entirely brown or extensively marked with yellow; gaster varying from almost entirely brown to brown with two distinct yellow transverse bands on posterior half. Eyes and ocelli red. Color variation is continuous in females. The few males examined have all color-variable structures brown.

Length: 0.9–1.2 mm.

Female.—Body elongate; gaster relatively narrow, gradually tapered to apex (Fig. 1), $1.8 \times$ thorax length.

Head: Antenna (Fig. 3) with relative length of scape, pedicel, funicle, club averaging 21.5:15.0:9.0:33.5 ($n = 5$); pedicel with distinct transverse ridges; two anelli present; funicle subquadrate, two-segmented, F1 very short, closely appressed to F2, F2 varying from as wide as long to $0.8 \times$ as wide as long, F2 with a single placoid sensillum; club

three-segmented, $\frac{1}{3}$ as wide as long. C1 and C2 subequal in length, length of C2 similar on all surfaces and consequently appearing longer than C1, C1 and C2 slightly longer than wide, C3 longer and much narrower, subconical, slightly longer than C2, ca. $\frac{2}{5}$ as wide as long. C1-3 each with two elongate placoid sensilla. Mandible tridentate. Maxillary palp one-segmented. Labial palp one-segmented, short, obsolescent.

Thorax: Mesoscutum, scutellum reticulate, each with two pair of elongate, narrow, spiniform setae. Mesophragma not extending beyond segment 2 of gaster.

Legs relatively elongate, slender; hind femora ca. $\frac{1}{4}$ as wide as long. Fore tibia spinose on dorsal surface (Fig. 6); size and number of spines variable (3-6, usually three), spine at apical $\frac{1}{3}$ of tibia most well developed, the other two at basal $\frac{2}{3}$ and apical $\frac{1}{5}$, respectively, rarely all spines poorly developed. Relative length of coxa, trochanter, femur, tibia, (tarsi) as follows: fore leg—27:13:37:36:(15:15:15); middle leg—20:15:37:53:(17:14:12); hind leg—35:17:41:60:(17:17:13); fore, middle, hind tibial spurs—5:12:8.

Fore wing (Fig. 4) not noticeably fumate at base, broad, width averaging 0.52 its length (measured from apex of tegula), suboblate apically, widest at apical $\frac{1}{2}$; marginal vein elongate, extending 0.46 wing length; stigmal vein constricted at base; relative length of subcostal, premarginal, marginal and stigmal veins 19:11:14:8, resp.; RS_1 well developed; fringe relatively short, longest setae varying from 0.4-0.9 length of stigmal vein. Hind wing (Fig. 5) with three distinct setal tracts on disk; posterior tract with slightly shorter setae than other two, not quite attaining apex of wing; longest fringe setae subequal to greatest wing width (at hamuli).

Gaster: Hypogynium (Fig. 2) relatively short, extending about half abdominal length; with a V-shaped sclerotized band apicomediaally, each arm of this band with one or two additional narrow, posteriorly project-

ing thickenings, each bearing a single seta apically; apex of V-band bisetate. Ovipositor extending ventrally along entire gaster but only apical $\frac{1}{10}$ projecting beyond apex (Fig. 1); base of shaft (1st and 2nd gonapophyses) only slightly anterior to gonangulae (ca. $\frac{1}{10}$ of shaft length lies anterior to gonangulae). Hind tibia varying from 0.29-0.35 \times ovipositor length (ratio not obviously correlated with hind tibial length).

Male.—Similar in most respects to female. Antenna with F2 more elongate, subrectangular in shape, 0.80 as wide as long; C3 shorter, about as long as wide, slightly shorter than C2. Gaster 1.5 \times length of thorax, blunt apically, last sternite divided. Genitalia structure basically as other *Chaetostripha* but shape unique for genus (cf. Figs. 7 & 8): relatively short, only 0.70 \times length of hind tibia, only slightly tapered to apex, with unarmed volsellae apically, not overtly bilobate at tip as in congeners.

Variation.—There is considerable color variation in *C. thanatophora*. Large series indicate that it is continuous. Series from Snowline Lodge in Fresno Co. are, on average, lighter with more yellow coloration than those from other locales. Snowline Lodge represents a relatively mesic site. It is the highest elevation in Fresno Co. (1259 m) where *C. thanatophora* was collected, and it is the only collecting area within the Ponderosa Pine belt (R. E. Rice, pers. comm.).

Type information.—Holotype female and allotype from USA, California, Calaveras Co., 5 mi. SE. San Andreas; R. E. Rice, coll.; deposited in the United States National Museum (see Records for information on dates). Nine paratype females from same locality deposited as follows: British Museum (Natural History), 1; Canadian National Collection, Ottawa, 1; University of California, Department of Entomology, Berkeley, 2; University of California, Department of Entomology, Riverside, 4; University of Naples, Institute of Agricultural Entomology, Portici, 1.

All type material is individually mounted in Canada balsam on glass slides.

Etymology.—Greek: "death bearer."

Diagnosis.—The relatively short ovipositor, nonfumate fore wing base, and short funicle separate *Chaetostricha thanatophora* from most congeners. In several species $\frac{1}{3}$ – $\frac{1}{2}$ or more of the ovipositor extends beyond the gaster; in *C. thanatophora* only the apical $\frac{1}{10}$ does so. In a few species, such as *C. fumipennis* (Blood), the ovipositor is similarly shortened but the basal half of the fore wing is strongly fumate.

Chaetostricha thanatophora is most similar phenetically to *C. miridiphaga* Viggiani from South Africa (Viggiani 1971) and *C. mahensis* (Kieffer) from the Seychelles (Kieffer 1917). The following comparison with these two species is based on published descriptions, on the badly damaged unique holotype male of *C. mahensis*, on a large series of what almost certainly is *C. mahensis* from Oman, and on two paratypes of *C. miridiphaga*.

The structure of the antenna, ovipositor and hypogynium, and wing coloration are similar in all three species. However, in *C. thanatophora* the gaster is considerably longer relative to the thorax ($1.8\times$ as long) and more distinctly tapered (Fig. 1). In *C. mahensis* and *C. miridiphaga*, the gaster is shorter (ca. $1.4\times$ as long as the thorax) and more ovate in shape (see Viggiani 1971, Fig. 1). Also, the ovipositor is considerably longer in *C. thanatophora*: it runs ventrally along the entire gaster and is over twice the length of the hind tibia. In the two African species the ovipositor occupies only the apical $\frac{2}{3}$ of the gaster, and is distinctly less than twice the length of the hind tibia.

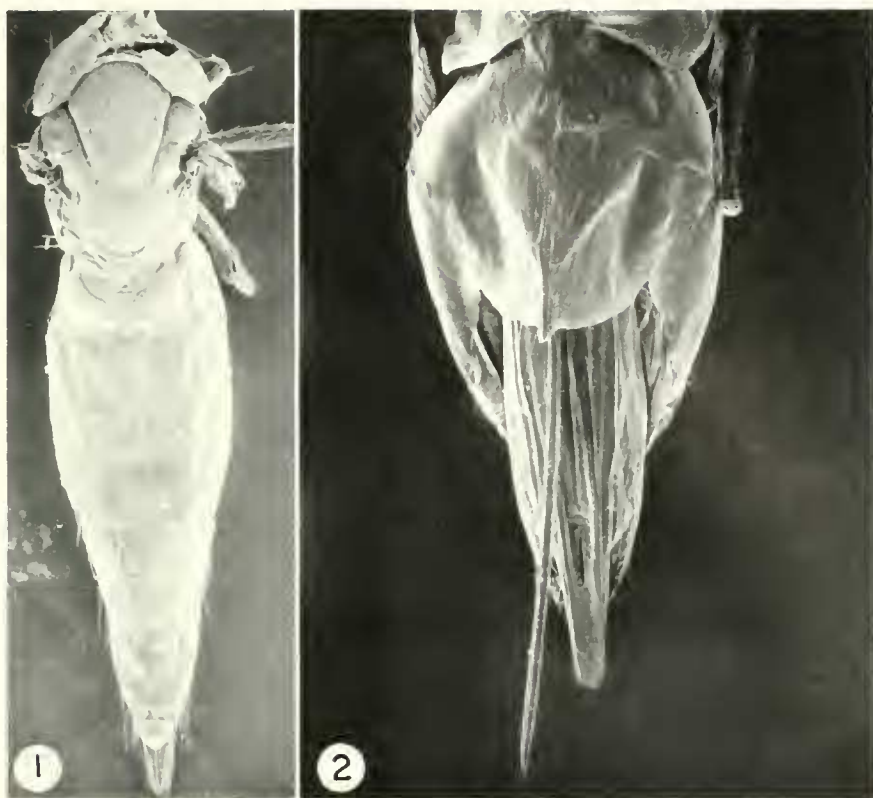
The shape of the mesoscutellar setae, the hind wing setal tracts, and the shape of the stigmal vein further distinguish *C. thanatophora* from these African species. In *C. miridiphaga* a distinct posterior setal tract in the hind wing is absent, and the mesoscutellar setae are relatively broad and blade-like, not narrowly spiniform as in *C. thana-*

tophora. In *C. mahensis* the stigmal is almost perpendicular to the marginal vein, and is strongly constricted basally, resulting in its basal width measuring only $\frac{1}{3}$ the greatest width (see Kieffer 1917, fig. 75). In *C. thanatophora*, as in most *Chaetostricha*, the stigmal is less abruptly angled to the marginal vein and less strongly constricted; its basal width is $\frac{1}{2}$ or more its greatest width (Fig. 4).

The most distinctive feature in *C. thanatophora* is the male genital structure. All other known male *Chaetostricha*, including those of *C. miridiphaga* and *C. mahensis*, have the copulatory organ relatively broad basally and tapering markedly to the apex forming a bottle-shaped structure with an apical width less than half the basal width (Fig. 8). The copulatory organ also is longer than the hind tibia in other species. In *C. mahensis*, for example, it is ca. $1.1\times$ as long as the hind tibia, and it is similar in shape and length in *C. miridiphaga*. It is even longer (ca. $1.5\times$ as long as the hind tibia) in most other species. In contrast, the copulatory organ in *C. thanatophora* is of subequal width throughout, not bottle-shaped (Fig. 7), and is much shorter, less than $\frac{3}{4}$ the length of the hind tibia.

I have seen a few North American *Chaetostricha* in collections in addition to *C. thanatophora*. These are more similar to Old World forms and must be closely compared to that fauna before they are dealt with taxonomically. All are separated from *C. thanatophora* by male genitalia (as above) and ovipositor structure. The ovipositor either is longer in these species (ca. $\frac{1}{3}$ of its length extending beyond gaster), the base of the shaft extends considerably anterior to the gonangulae (ca. $\frac{1}{4}$ the shaft length lies anterior to gonangulae), or the hypogynium is much longer, extending near or beyond the apex of the gaster.

Biology.—*Chaetostricha thanatophora* has been collected from several sites in central and northern California parasitizing eggs of *Neurocolpus longirostris*. Most of the ad-



Figs. 1, 2. *Chaetostricha thanatophora*, female. 1, Dorsal view of thorax and gaster (120 \times). 2, Venter of gaster showing hypogynium and ovipositor (150 \times).

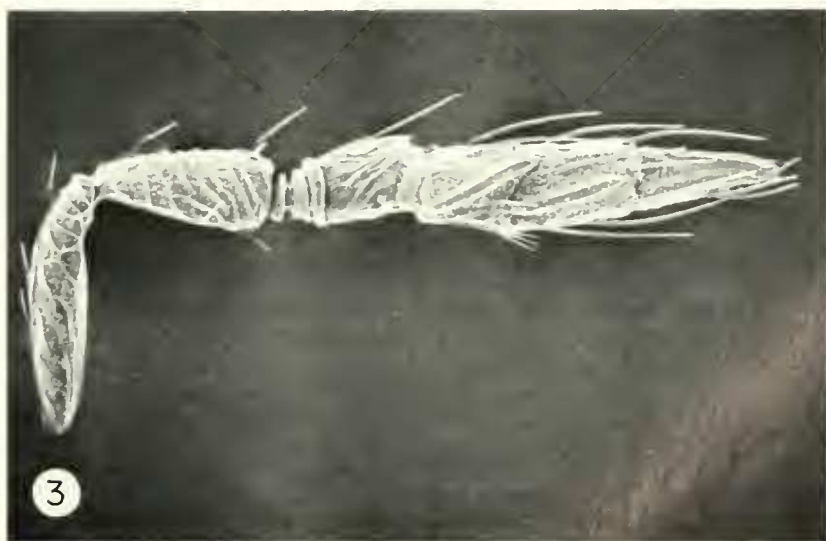


Fig. 3. *Chaetostricha thanatophora*, female antenna (406 \times).

16/III-4/V, 17/IV-12/V, 151 ♀; Piedra (335 m), 8/IV-14/IV, 5 ♀; Snowline Lodge (1259 m) (10 mi. E. Squaw Valley), 19/V-6/VI, 26/V-2/VI, 31/V-13/VI, 33 ♀; Squaw Valley (493 m), 15/IV-7/V, 20 ♀; Watts Valley (491 m) (5 mi. E. Academy), 17/IV-12/V, 9 ♀, 2 ♂; Wonder Valley (283 m) (6 mi. SE. Piedra), 22/IV-4/V, 12 ♀. *Kern Co.*: Stallion Springs (11 mi. SW. Tehachapi), 24/V-3/VI, 19 ♀; Woody, 6 mi. E., 30/V, 2 ♀. *Tuolumne Co.*: Rawhide, 31/V-14/VI, 8 ♀. *Yolo Co.*: Brooks, 31/V-7/VI; Rumsey, 31/V-12/VI, 12 ♀. All of the above locales are in the foothills of the Sacramento (Yolo Co.) and San Joaquin valleys.

Additional records as follows: *Riverside Co.*: Menifee Valley (hills on W. end), 33°39'N., 117°13'W. (550 m), 6-11/X, 1-8/XI, 6-21/IX, 2 ♀, 1 ♂, in yellow pan traps under *Eriogonum gracile* Benth., J. D. Pinto collr. *San Bernardino Co.*: Big Bear City, ca. 1 mi. N., 16/VI, 1 ♀, sweeping willow etc., R. K. Velten collr.

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LITERATURE CITED

- Doutt, R. L. and G. Viggiani. 1968. The classification of the Trichogrammatidae (Hymenoptera: Chalcidoidea). Proc. Calif. Acad. Sci. (4th ser.), 35: 477-586.
- Kieffer, J. J. 1917. Eine neue Trichogrammid von den Seychellen Inseln. Novit. Zool. 24: 230.
- Rice, R. E., W. J. Bentley and R. H. Beede. 1988. Insect and mite pests of pistachios in California. Univ. Calif. Ext. Publ. 21452, 26 pp.
- Risbec, J. 1956. Hymenopteres parasites du Cameroun (2c Contribution). Bull. Inst. Fr. Afr. Noire (ser A). 18: 7-164.
- Silvestri, F. 1918. Contribuzione alla conoscenza del genere *Centrobia* Forster (Hymenoptera, Chalcididae). Boll. Lab. Zool. Agr. Portici 12: 245-251.
- Viggiani, G. 1971. A new species of *Chaetostricha* Walk. from Africa (XXVI—Researches on the Hymenoptera Chalcidoidea). Jour. Entomol. Soc. So. Afr. 34: 33-35.